IN THE CLAIMS

1. (original) A wideband radio transceiver system for full-duplex communication of signals associated with one or more wireless communication protocols operating in a common frequency band, the system comprising:

a wideband radio transceiver that detects energy in a frequency band and downconverts the energy to a low intermediate frequency or baseband signal, and that upconverts one or more signals to be transmitted in the frequency band;

an analog-to-digital converter (ADC) coupled to the wideband radio transceiver that converts the low intermediate frequency or baseband signal to a digital receive signal;

a receive processing section comprising:

one or more decimators, each associated with a corresponding communication protocol, and which decimates a corresponding baseband signal derived from the digital receive signal to a convenient sampling rate for a corresponding communication protocol to generate a complex baseband signal for each communication protocol; and

one more detectors, each associated with a corresponding communication protocol, and which demodulates a corresponding complex baseband signal to recover data therefrom;

a transmit processing section comprising:

one or more modulators, associated with a corresponding communication protocol, coupled to receive data to be transmitted using the communication protocol, each modulator generating a complex baseband signal corresponding to a communication protocol;

one or more interpolators, associated with a corresponding communication protocol, each interpolator increases a sampling rate of a corresponding complex baseband signal output by the one or more modulators; and

one or more upconverters, each associated with a corresponding communication protocol and which upconverts an output of a corresponding interpolator

to generate an intermediate frequency signal having a desired offset position in the frequency band;

a summer coupled to the output of the upconverters to sum each intermediate frequency signal output by the upconverter bank to generate a composite intermediate frequency signal; and

a digital-to-analog converter coupled to the summer that converts the composite intermediate frequency signal to a composite analog signal;

wherein the receive processing section and the transmit processing section are operable to simultaneously process at least one receive signal and at least one transmit signal associated with one or more communication protocols in the frequency band.

2. (original) The system of claim 1, wherein the receive processing section and the transmit processing section are implemented by one or more digital application specific and/or general purpose processors that execute firmware or software, respectively, to process signals as required by each communication protocol.

3. (currently amended) The system of claim 1, wherein the at least one of each of the decimators, detectors, interpolators, upconverters and modulators are capable of processing of signals according to one or more of the Bluetooth™ communication protocol and versions thereof~~,~~ and the IEEE 802.11 communication protocol and versions thereof~~, and the HomeRF communication protocol and versions thereof~~.

4. (original) The system of claim 1, and further comprising a transmit interference canceller coupled between the summer after the outputs of the upconverters, the transmit interference canceller comprising:

a coupled signal path estimator coupled to receive as input the composite intermediate frequency signal output by the summer, the coupled signal path estimator comprising one or more of the following elements to operate on the composite intermediate frequency signal: a multiplier for multiplying the composite intermediate frequency signal by phase and attenuation factors, a filter having a filter function, a non-linear distortion processing element having a non-linear distortion function, and an adder for adding a complex additive constant,

wherein values for the phase and attenuation factors, the filter function, the non-linear distortion function and the complex additive constant being generated using an

iterative algorithm to minimize an error signal that is digitized by the analog-to-digital converter in the receive signal path section, and to produce as output a digital signal that represents, at baseband, a transmit signal coupled to the receive signal path, adjusted for one or more of phase, amplitude, frequency distortion, non-linear distortion and carrier leakage/DC offset associated with the coupled signal path;

a digital-to-analog converter coupled to the output of the coupled signal path estimator to convert the output thereof to an analog signal; an upconverter coupled to the output of the digital-to-analog converter to upconvert the analog signal to a radio frequency of the receive signal thereby producing a signal that is a replica of the reflected transmit signal; and

an adder coupled between the output of the receive antenna and an input to the downconverter in the receive signal path section to subtract the signal output by the upconverter from energy detected by the receive antenna, thereby suppressing the transmit signal that is being transmitted at the same time the receive signal path section is processing one or more receive signals.

5. (original) The system of claim 4, and further comprising a processor coupled to receive the error signal and the composite intermediate frequency signal, and generating values for the phase and attenuation factors, the filter function, the non-linear distortion function and the complex added constant.

6. (original) The system of claim 1, and further comprising a transmit interference canceller coupled between the summer after the output of the upconverter bank and an output of the receive antenna, the transmit interference canceller comprising:

a coupled signal path estimator coupled to receive as input the composite intermediate frequency signal output by the summer, the coupled signal path estimator comprising one or more of the following elements to operate on the composite intermediate frequency signal: a multiplier for multiplying the composite intermediate frequency signal by phase and attenuation factors, a filter having a filter function, a non-linear distortion processing element having a non-linear distortion function, and an adder for adding a complex additive constant,

wherein values for the phase and attenuation factors, the filter function, the non-linear distortion function and the complex additive constant being generated using an

iterative algorithm to minimize an error signal that is digitized by the analog-to-digital converter in the receive signal path section, and to produce as output a digital signal that represents, at baseband, a transmit signal coupled to the receive signal path, adjusted for one or more of phase, amplitude, frequency distortion, non-linear distortion and carrier leakage/DC offset associated with the coupled signal path;

a digital-to-analog converter coupled to the output of the coupled signal path estimator to convert the output thereof to an analog signal; and

an adder coupled between the output of the downconverter and the input to the analog-to-digital converter in the receive signal path section to subtract the analog signal output by the digital-to-analog converter of the transmit interference canceller from the output of the downconverter, thereby suppressing the transmit signal that is being transmitted at the same time the receive signal path section is processing one or more receive signals.

7. (original) The system of claim 1, and further comprising:

a coupled signal path estimator coupled to receive as input the composite intermediate frequency signal output by the summer, the signal path estimator comprising one or more of the following elements to operate on the composite intermediate frequency signal: a multiplier for multiplying the composite intermediate frequency signal by phase and attenuation factors, a filter having a filter function, a non-linear distortion processing element having a non-linear distortion function, and an adder for adding a complex additive constant, values for the phase and attenuation factors, the filter function, the non-linear distortion function and the complex additive constant being generated using an iterative algorithm to minimize an error signal that is digitized by the analog-to-digital converter in the receive signal path section; and

a predistortion look up table that stores values to predistort the composite intermediate frequency signal output by the summer in order to compensate for non-linear distortion generated by the power amplifier in the transmit signal path section, values for the predistortion look up table being generated to minimize a weighted mean-square distortion between the composite intermediate frequency signal and a signal which is the sum of the output of the coupled signal path estimator and the output of the analog-to-digital converter in the receive signal path section.

8. (original) The system of claim 7, and further comprising a processor coupled to receive the signal which is the sum of the output of the coupled signal path estimator and the output of the analog-to-digital converter in the receive signal path section, and the composite intermediate frequency signal to generate values for the predistortion look up table.

9. (original) The system of claim 8, wherein the processor generates values which are weighted so as to provide distortion adjustment across a spectrum only where energy associated when a transmitted signal exists.

10. (original) The system of claim 1, wherein the receive signal path section processes energy detected by the receive antenna in the frequency band simultaneously with the transmit signal path section processing signals that are transmitted in the frequency band.

11. (original) The system of claim 1, and further comprising a transmit carrier suppressor comprising a low pass filter coupled to the output of the analog-to-digital converter in the receive signal path section and an accumulator coupled to the output of the low pass filter, the accumulator having a large time constant relative to a transmit packet duration so as to suppress leakage of energy associated with a transmit carrier, wherein an output of the accumulator is subtracted from the composite intermediate frequency signal before input to the digital-to-analog converter in the transmit signal path section.

12. (previously added) A radio transceiver system for communication of signals associated with one or more wireless communication protocols occurring in a common frequency band, the system comprising:

a radio transceiver that detects energy in a frequency band and downconverts the energy to a low intermediate frequency or baseband signal, and that upconverts one or more signals to be transmitted in the frequency band; and

a baseband signal processing section coupled to the radio transceiver that performs baseband demodulation of signals received by the radio transceiver to produce a plurality of baseband receive signals associated with a corresponding communication protocol, and that performs baseband modulation of a plurality of baseband transmit signals associated with a corresponding communication protocol, wherein the baseband

signal processing section is operable to simultaneously process multiple signals associated with one or more communication protocols for transmission and/or reception.

13. (previously added) A radio system comprising:

a radio receiver that detects energy in a frequency band in which signals of multiple communication protocol types may be present and downconverts the energy to a low intermediate frequency or baseband signal; and

an analog-to-digital converter coupled to the radio receiver to convert an analog signal output by the radio receiver to a digital signal to facilitate analysis of signals in the frequency band.

14. (new) The system of claim 12, wherein the baseband signal processing section performs baseband modulation according to a communication protocol for each of multiple transmit signals for transmission by the radio transceiver in corresponding frequency channels in the frequency band, and performs baseband demodulation according to the communication protocol of the baseband signal, to thereby simultaneously support multiple channels in the frequency band of the same communication protocol.

15. (new) The system of claim 14, wherein the baseband signal processing section performs baseband modulation and baseband demodulation to simultaneously support multiple channels of the same wireless location area network (WLAN) communication protocol technology in the frequency band.

16. (new) A radio transceiver system for communication of signals occurring in multiple channels in a frequency band, the system comprising:

a radio transceiver that downconverts energy in the frequency band including energy in the multiple channels and produces a baseband receive signal representative thereof, and that upconverts a plurality of transmit signals each to be transmitted in a corresponding one of the multiple channels in the frequency band;

an analog-to-digital converter (ADC) coupled to the radio transceiver that converts the baseband receive signal to a digital receive signal;

a digital-to-analog converter (DAC) coupled to the radio transceiver that converts digital transmit signals to analog transmit signals for upconversion by the radio transceiver; and

a baseband signal processing section coupled to the ADC and to the DAC that baseband demodulates the digital receive signal to recover multiple receive data associated with corresponding channels in the frequency band and that modulates multiple transmit data to produce digital transmit signals for processing by the DAC and transmission by the radio transceiver in corresponding channels in the frequency band.

17. (new) The system of claim 16, wherein the baseband signal processing section performs baseband modulation according to a communication protocol for each of multiple transmit data for transmission by the radio transceiver in corresponding channels in the frequency band, and performs baseband demodulation according to the communication protocol of the digital receive signal representing receive signals for corresponding channels in the frequency band, to thereby simultaneously support multiple channels in the frequency band of the same communication protocol.

18. (new) The system of claim 17, wherein the baseband signal processing section performs baseband modulation and baseband demodulation to simultaneously support multiple channels of the same wireless location area network (WLAN) communication protocol technology in the frequency band.

19. (new) The system of claim 1, wherein the transmit processing section and receive processing section are operable to simultaneously support multiple channels of the same wireless location area network (WLAN) communication protocol technology in the frequency band.